TARBELL

Cassette and Disk BASIC

Tarbell BASIC incorporates many new features which provide outstanding advantages in speed, debugging, file locating, and tailoring to the user's own requirements. This implementation of Tarbell BASIC is as an interpreter, allowing the programmer to quickly debug online, rather than having to move back and forth through edit, compile, and run operations. By obtaining the source, available as a listing or on CP/M* disk, programmers can readily remove all portions of the interpreter which are not required.

Z80 owners will be able to take advantage of the availability of Tarbell BASIC source listings by patching in Z80 instructions for existing subroutines which are equivalent to Z80 instructions, further improving the speed of Tarbell BASIC.

LINE DESCRIPTORS A unique feature in Tarbell BASIC is the use of alphanumeric line labels, which provides the advantage of high readability, and speed for large programs. Pointers are substituted for variable and label reference. Thus, by using the vectoring method, lengthy searches are eliminated. Tarbell BASIC does not restrict variable names to a few significant characters. Instead, it allows line descriptors and variable names to be as long as the programmer desires. A line descriptor may be either a single character, or several, and need not be in a special order. This enables the programmer to easily recall the name of a line or subroutine, making Tarbell BASIC highly readable.

ASSIGNMENT OF I/O Tarbell BASIC creates a new standard of flexibility by providing commands which allow any output statement to transfer data to most output devices. To accomplish this, devices are categorized into logical and physical designations. A logical device is activated by input and output commands. A physical device is the actual hardware, such as CRT, printer or storage device. Up to 10 physical devices may be assigned or deassigned to 6 different logical devices. Using the I/O section listing provided in the documentation, input/output configurations can be modified to suit the user's requirements.

READ AND WRITE STRING DATA Unlike other BASICs which limit data to numbers, Tarbell BASIC lets one use unlimited alphanumeric strings which can be written to and read from cassette or diskette.

UNLIMITED LENGTH OF VARIABLE NAMES AND STRINGS Other BASICs frequently limit the use of a string to 256 bytes in memory, and variable names are limited to single characters and a number. Using Tarbell BASIC, there is no limit to the line length or variable names that can be used. This feature is very useful for word processing types of applications, and identifying application functions.

PROCEDURES WITH INDEPENDENT VARIABLES This capability is borrowed from languages like Fortran, Algol, Pascal and others. It permits unlimited use of same and similar variables when declared as local in a library of subroutines. The user is now assured there will be no conflict with variables used in several subroutines within the same program.

NUMBER SYSTEM 10 DIGITS BCD INTEGER OR FLOATING POINT Unlike binary number systems, in BCD there is an exact equivalent to .01, so there are no round-off errors when adding dollars and cents.

MULTI-FILE CAPABILITY As many as 64 files may be open at one time.

RANDOM ACCESS Disk files may be written, read, or updated using random access. This feature allows quick access to any record in the file without having to search through the entire file. Record lengths are set by the programmer so that only the memory space required is used, greatly enhancing Tarbell BASIC's use of machine time and memory. *Note that Multi-File and Random Access capabilities of Tarbell BASIC are only applicable to the CP/M disk version.*

ROMABLE Tarbell BASIC can be written to ROM when available, reserving RAM space for other requirements.

TARBELL BASIC FEATURES not usually found in other BASICs.

COMMANDS

BYE Causes a jump to location 0000 in memory.

CHANGE Combines DELETE and ENTER commands.

DELETE Eliminates designated line or lines.

ENTER Tarbell BASIC goes to entry mode for the input of new program statements.

SYMBOL Types table of variable names, line descriptors, their types and locations.

EDIT Interpreter enters edit mode on designated line, and permits editing using single letter commands. Also allows moving from 1 line to another.

STATEMENTS

APPEND Appends section from ASCII Load device to end of program in memory.

ASSIGN Assigns physical device to logical device.

BGET Reads from binary input logical device into named variables.

BLOAD Reads program named into memory from binary input logical devices. Chaining is allowed.

BPUT Writes named variable onto binary output logical device.

BSAVE Writes program named onto binary output logical device.

CHANNEL Prints table of assignments of physical to logical device.

CLOSE Closes file previously opened under logical unit.

DROP Drops assignment of logical device to physical device.

GET Specified file is read from ASCII mass storage device into variables.

GOPROC Calls statement, passing variables on list.

LOAD Loads program from ASCII Load device into memory. Chaining is allowed.

OPEN Makes file available through logical device specified by numeric expression.

PROCEDURE Used to declare local variables.

PUT Write from variable on list to ASCII save device.

RECEIVE Transfers values of variables from GOPROC or RETURN to variable list.

RESTORE Sets READ DATA pointer to first, or a specified, data statement.

SAVE Writes BASIC program from memory to ASCII save device.

INTRINSIC FUNCTIONS

CALL Calls machine language subroutine at specified address.

EOF Returns false (0) if end-of-file has not been encountered, or true (-1) if end-of-file has been encountered.

HEX Returns decimal equivalent of a hexidecimal string.

HEX$ Returns hexadecimal string representation of decimal value of numeric expression.

LOC Returns decimal address of a variable value.

MATCH Returns position of first occurence of first string expression in second string expression.

OCT Returns decimal equivalent of string expression.

OCT$ Returns string which represents octal value of numeric expression.

SPECIAL FUNCTIONS

Special functions are used mainly for disk input/output statements to pass useful parameters. They set values into memory locations, and the values can be used by external subroutines.

DISK Normally used to specify number of the disk drive chosen.

DO The first expression, either numeric or string, decides the type of function, and the second expression is used to pass the argument.

FILE Specifies number of the file being used.

TYPE Used to specify the type of file being accessed, either random or sequential.

RECORD Used to specify record number of random file.

Tarbell BASIC occupies 22K of RAM. Available on cassette and CP/M Disk. Price $36 each. Manual includes complete discussion of operation, and even lists known bugs, related publications, and sample program. Tarbell BASIC source available on paper or CP/M Disk for an additional $25. California residents add 6% sales tax when ordering.

**CP/M is a trademark of Digital Research.*

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Processor Technology Software Package #1 on Tarbell Cassette

Modified for low memory and Tarbell Cassette
By Fred Clark and Don Tarbell

This software is intended for the development of assembly language programming. Programs may be entered from the keyboard in standard assembly language format, edited, assembled, and saved on cassette in either source or machine format. These programs may then be loaded back into memory in the future for listing, editing, or running. Following is a summary of the commands. All address and byte information is in hexadecimal.

FILE	/NAME/	0	• Creates a file of name NAME at address AAAA (hex). Up to six text files can be in memory at the same time. The file just created is the current file.
FILE	/NAME/	0	• This command deletes the file named NAME.
FILE	/NAME/		• Makes named file the current file.
FILE			• Prints starting and ending addresses of the current file and it's name.
FILES			• Lists the name, starting and ending address for each of the files in the system. Current files at top.
NAME	/NAME/		• Rename current file to NAME.
DUMP	SSSS	EEEE	• Dumps the contents of memory from SSSS to EEEE.
EXEC	AAAA		• Executes machine language program at AAAA.
EXEC	/NAME/		• Searches cassette for named file, loads and executes it.
ENTR	AAAA		• Enter data into memory: B1 B2 B3 B4/.
LIST	NNNN		• Lists current file starting at line NNNN.
NLIS	NNNN		• Lists current file at NNNN without line numbers.
DELT	NNNN	MMMM	• Deletes line NNNN through MMMM from current file.
NNNN	(text)		• Enter a line of text into current file. Always use 4 decimal digits. • Operates similar to BASIC, in that numbered lines are ordered automatically.
RNUM	N		• Renumber current file by increment N (hex).
ASSM	AAAA		• Assembles current file into address AAAA.
ASSM	AAAA	BBBB	• Assembles at address AAAA, but puts code at BBBB.
CUST			• Execute customer (user) routine at address E000.
SFIL			• Save current file onto cassette.
LFIL			• Load current file from cassette. • Name of file on tape must match name of current file.
CFIL			• Check a cassette file written with SFIL command above, for errors, without overwriting current file.
AFIL			• Append file from cassette to current file.
SAVE	SSSS	EEEE	• Save block of memory from SSSS to EEEE on cassette.
LOAD	SSSS		• Load block of memory from cassette starting at SSSS.
CHEK	SSSS		Check cassette file written with SAVE command.

This software will run in your IMSAI or ALTAIR* computer. It loads into the first 4096 bytes of memory, and uses 2048 bytes following, for tables and scratch pad. CTL-C escapes from any printing. CTL-W freezes printing until another character is typed. CTL-X cancels the line you are typing.

Cassette Tape with software and instructions: $5.00
A complete listing is available for $5.00.

**ALTAIR is a trade-mark/tradename of Pertec Computer Corp.*

EMPL on Tarbell Cassette

Copyright 1977 by Erik Mueller
Distributed by Tarbell Electronics

8K EMPL is a micro APL for the Intel 8080. The current version fits in the first 5,376 bytes of memory. All the special symbols and operators of APL have been adapted to the ASCII character set.

Although this is not a full implementation of APL, it is well suited to educational purposes.

EMPL operates in two modes: normal Execution Mode and Definition Mode. The Definition Mode allows the user to enter functions. The Execution Mode executes all instructions immediately.

When in Execution Mode, the computer indents five spaces and waits for input. As an example, when an arithmetic expression is typed, EMPL will respond with the results.

EXAMPLE:

User types: 2-6-3
Computer responds -1 (Computer responses underlined)

All expressions are evaluated by the right-to-left rule. That is, each operator takes as its right argument everything to its right. For example, in the above problem, EMPL first evaluates 6-3 which equals 3, then it evaluates 2-3 which equals -1.

The range is +32767—double-byte integer arithmetic is used.

Variable names may be any length of alphabetic characters.

Single dimensional arrays are called vectors in EMPL. A variable may be specified to be a vector of any length, provided sufficient memory is available.

Constants may be numeric or string vectors. Since the internal representations of both is the same, operations may be performed between the two types.

Tarbell Electronics distributes EMPL on Tarbell Cassette with manual for $15, or on CP/M Disk with manual for $20. California residents please add 6% sales tax.

CP/M is a trademark/tradename of Digital Research.

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CBASIC-2

CBASIC-2 is a commercial business language, written by Software Systems, which is upward compatible from BASIC-E. Similar in concept to BASIC-E, the CBASIC-2 programming system compiles BASIC programs into pseudo machine code, and then executes the machine code using a run time program monitor in a minimum 24K CP/M system. CBASIC-2 has been greatly improved to include a number of business-oriented facilities which allow decimal computations to fourteen digits of precision, as well as data formating with the PRINT USING statement.

Specific functions of CBASIC-2, not included in BASIC-E, include the LPRINTER and CONSOLE statements which allow direct output to the line printer and console. Random and sequential access to disk files is provided, where the logical length is programmatically specified. File maintenance is provided through statements which open, close, create, delete, and rename files on the diskette drives. The INPUT LINE statement allows an entire string of characters to be read from the console so that proper input line formats can be checked before reading the data.

String functions include dynamic allocation, multiple-dimension arrays, concatenation of strings, and the LEFT, RIGHT, MID, LOW, CHR, STR, and MATCH functions. Further, the PEEK, POKE, and CALL statements of CBASIC-2 are available for access to assembly language programs.

An INCLUDE facility is also provided allowing access to separately stored subroutines which are commonly used throughout a set of programs. The external subroutines can be written and debugged once, and then included in various programs which use these subroutines.

General programming facilities of CBASIC-2 include variable names to 31 characters, optional line numbers, dynamic debugging tracers, and optional program listings on the line printer or on a disk file.

The CBASIC-2 programming system is available for immediate distribution in machine code form on a CP/M compatible diskette. The software is proprietary, however, and thus may not be copied for use by any individual other than the purchaser.

I would like to purchase:

☐ CBASIC-2 diskette and manual	$100.00
☐ CBASIC-2 manual only	15.00
☐ CBASIC-2 diskette only	85.00

California residents, please add 6% sales tax.

W Check enclosed
☐ Money order enclosed

CONSTAT%: obtain console status
CONCHAR%: get a character from console
UCASE$: convert a string to upper case
COMMAND$: return contents of command line
%PAGE: sets page length
%EJECT: skip a page in LST file

The best Business BASIC has gotten better.

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For our valued customers, we are happy to pass along an update at a low price. CBASIC version-one owners registered with FE can update to the new CBASIC-2 for

$50.00

For your convenience in ordering, we have included a postage-paid return card. (A note to customers ordering updates: please include the registration number from CBASIC version one.)

Don't wait. Put this great Business Basic to work right away.

CBASIC-2 for new customers is $100

Farbell Electronics

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S P O O L E R: PARALLEL BACKGROUND PRINT WITHOUT HARDWARE INTERRUPT FOR CP/M USERS

SPOOLER is a KLH Systems software product. It is designed to intercept all output directed to the list device, spool the output to a high speed disk file, and then ultimately to direct this spooled information to the low speed printer device during unused cycle time while the CPU is busy waiting on the transferring of data to and from the console.

Some of the main features of the SPOOLER system are as follows:

1) The 8080 microprocessor computer system is no longer slowed by a low speed print device, thereby greatly increasing system throughput.

2) The SPOOLER is optional even when installed. Though implemented, SPOOLER may be suspended, or never initiated, still allowing direct output to the list device.

3) The user may select the amount of disk space to allocate to the spool subsystem. This space is allocated in 128 sector increments with a maximum of five extents, for a total of 640 sectors.

4) The user may select the disk drive.

5) All print files are concatenated for first-in first-out printing.

6) SPOOLER will never lose any output due to insufficient space allocation. If all disk space allocated has been used, SPOOLER will enter an output-only routine until sufficient space has been freed.

7) If necessary, SPOOLER will immediately reuse unused disk space, keeping the required file space to a minimum. SPOOLER treats all its disk files as circulating file space, reusing the sectors already output to the list device.

8) SPOOLER may be suspended and restarted, allowing for more critical output to be listed ahead of the spooled files, or for other temporary use of the disk drive containing the spool files. Under this situation, SPOOLER will halt at the completion of the line it is currently printing (if in output mode) and resume with the next line when restarted.

9) Although initially much larger, SPOOLER will strip out all its nonessential routines and relocate itself to operate in less than 1K of memory above CP/M, thereby becoming invulnerable to the memory contention below CP/M.

10) SPOOLER is completely compatible with the CP/M file system, and maps its allocated disk space similarly to that of its host system.

11) SPOOLER allows paralel processing without hardware interrupt, and has very minimal impact on the other processes operating in the foreground.

IF YOU FEEL YOUR TIME HAS ANY VALUE .... SPOOLER WILL PAY FOR ITSELF IN LESS THAN A MONTH!! Price...~~$50.00~~ 70.00 available now from TARBELL.

CP/M™ BY DIGITAL RESEARCH — A COMPLETE FLOPPY DISK OPERATING SYSTEM FOR THE TARBELL FLOPPY DISK INTERFACE.

The CP/M Disk operating system has been in existence for over three years in various manufacturer's products, and thus has had extensive field testing. It is now being made available to the hobby community. It is licensed software, and copying for other individuals is prohibited. We feel this is justified, as the cost, $100, is low for such a good system.

The following commands are built in to the operating system:

DIR	List all or selected portions of the directory (file list)
TYPE	Type the contents of an ASCII file on the console
REN	Rename a file to a different name
ERA	Erase a file or files from the disk
SAVE	Save memory on disk for later load

The following programs are included on the disk, and are invoked just like commands by typing the name and any arguments:

PIP	Peripheral Interchange Program moves files around
SUBMIT	Batch processing program for predefined list of commands
ED	A really nice, string-oriented text editor
ASM	Assembler to convert assembly language to machine code
DDT	Dynamic Debugging Tool for memory dumps, loads, traces
LOAD	Convert hex file to memory image file
DUMP	Dump file in hex onto console
SYSGEN	Generates new CP/M systems for backup
BASIC	BASIC-E compiler has both sequential and random file access
RUN	Run-time interpreter for BASIC-E programs
STAT	Prints the amount of disk storage still available and amount used for each file
CPM	Generates different sized CP/M systems
COPY	Copies from one disk onto another, track by track, in about 1 minute
TAPELIB	Provides extensive disk-to-cassette facilities.

The following source files are included on the disk:

CASDSK	Transfers the named file from Tarbell cassette to disk
DSKCAS	Transfers the named file from disk to Tarbell cassette
SBOOT	Cold-Start loader which is loaded by bootstrap program
CBIOS	Customer's Basic Input/Output System includes all drivers
FORMAT	Reformats crashed diskettes
COPY	Assembly language source for program above
INV	Basic inventory program example

Tarbell Electronics provides the system modified to work with the Tarbell floppy disk interface and a simple console interface, such as a teletype. The console is addressed with port O for status and port 1 for data. Bit 0 of status low means keyboard ready, and bit 7 of status low means printer ready. It is set up to work in 24 kbytes. The documentation includes a listing of the BIOS, and instructions which will enable you to patch the CBIOS for your own system.

As of November 1, 1978 the CP/M User's Group had 33 diskettes full of software. It costs $4 to get on the mailing list, and the diskettes are $8 each. The address is 164 West 83rd Street, New York, New York 10024.

DOCUMENTATION:

CP/M FEATURES AND FACILITIES MANUAL
CP/M EDITOR, ASSEMBLER, AND DEBUGGER MANUALS
CP/M INTERFACE GUIDE
CP/M SYSTEM ALTERATION GUIDE
TARBELL CP/M USER'S GUIDE

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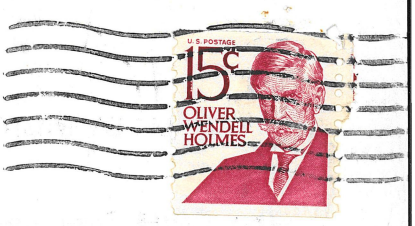

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